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New species of Drilliidae and Turridae from southern Africa (Mollusca: Gastropoda: Conoidea)

by

Richard N. Kilburn

Natal Museum, P. Bag 9070, Pietermaritzburg 3200, South Africa, and School of
Biological & Conservation Sciences, University of KwaZulu-Natal, P. Bag X01,
Scottsville 3209, South Africa; dickkilburn@sai.co.za

ABSTRACT

New South African species of the endemic turrid genera *Inkinga* Kilburn, 1988, and *Naudedrillia* Kilburn, 1988, and the tropical Indo-Pacific genus *Gemmula* Weinkauff, 1875, are described.

New species: *Inkinga carnosa* (family Drilliidae) and *Naudedrillia hayesi* (family Turridae, subfamily Crassispirinae) from the Agulhas Bank; *Gemmula alwyni* (family Turridae, subfamily Turrinae) from KwaZulu-Natal north to the Mozambique Channel.

KEY WORDS: Crassispirinae, Drilliidae, Turridae, Turrinae, *Inkinga*, *Gemmula, Naudedrillia*, Southern Africa, taxonomy.

INTRODUCTION

The Turridae and Drilliidae of South Africa and Mozambique were monographed by Kilburn (1983 and 1988 respectively). Additional species were described by Kilburn (1998). More recently, material found in the demersal bycatch of commercial trawlers and submitted to the Natal Museum by amateur shell-collectors, was found to contain several additional undescribed species of these families. However, it should be noted that the localities given for the two Agulhas Bank species here described probably indicate general trawling areas, not precise stations.

ABBREVIATIONS

a/l	ratio of aperture length (measured along main shell axis) to total shell length
b/l	ratio of breadth to total length
BMNH	The Natural History Museum, London
MNHN	Muséum National d'Histoire Naturelle, Paris
NMSA	Natal Museum, Pietermaritzburg, South Africa
ZSI	Zoological Survey of India, Calcutta (Kolkata), India.

TAXONOMY

Family Drilliidae Olsson, 1964

Inkinga Kilburn, 1988

Type species (o.d.): *Pleurotoma* (*Clionella*) *platystoma* E.A. Smith, 1877.

Remarks: Only two species, both endemic to South Africa, have previously been referred to this genus.

Key to species of *Inkinga*

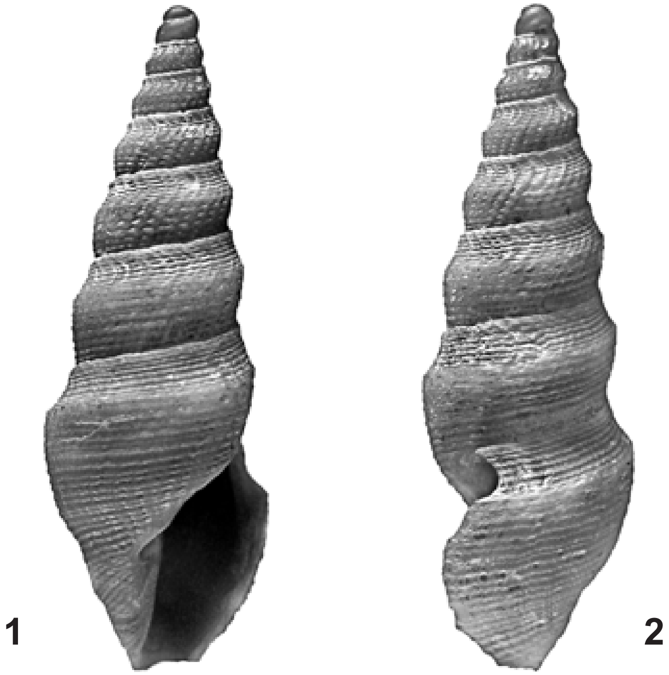
1. Shoulder nodular, subsutural cord distinct; spiral ridges broad and flattened; shell broad (b/l 0.38–0.40) .... *platystoma*
– Shoulder not nodular, subsutural cord weak or absent on later whorls; spiral ridges fine, shell narrower (b/l 0.33–0.35) 2
2. Whorls evenly convex; outer lip not alate; without axial sculpture .... *cockae*
– Whorls with a distinct peripheral angle; outer lip alate; fine axial ribs on spire whorls .... **carnosa** sp. n.

Inkinga carnosa Kilburn, sp. n.

Figs 1, 2

Etymology: L. *carnosus* (flesh-like). In reference to colour.

Description: Shell claviform, b/l 0.34–0.35, base short, obliquely truncate, very slightly indented, aperture 0.35–0.37 of total length, apex blunt. Outer lip thin, somewhat alate, in side view strongly convex, not preceded by a varix; anal sinus openly U-shaped, directed slightly adapically, occupying entire subsutural slope with its apex slightly above periphery; columella twisted, edge flattened with a thick callus, its edge free; no parietal pad. Whorls concave below suture, anteriorly convex with weakly angular periphery, situated below median on early whorls, above median on later ones, forming



Figs 1, 2. *Inkinga carnosa* sp. n., holotype NMSA W2716/T2022; off Cape St Francis, Agulhas Bank, 150 m; 13.8 x 4.7 mm: (1) aperture view, (2) lateral view.

a slight shoulder on last whorl; suture distinct, notch-like on early whorls; no subsutural cord, but slightly raised at suture.

Sculpture weak, spiral threads dominant on later whorls, axial riblets on early ones. Axial riblets on early whorls strongly sigmoid, fairly sharply incised, close and angular in transverse section, suture to suture, approx. 14 on first teleoconch whorl, 18 on second, barely raised on penultimate whorl, more or less obsolete on last whorl. Spiral threads 7–9 on first whorl, 16–18 on penultimate whorl, narrower than their intervals; base of body whorl with 15–16 threads, obsolete on end of rostrum.

Protoconch papilliform, of 2 whorls, with depressed, rounded protoconch I, smooth except for last quarter-whorl, which has weak, slightly sinuous, opisthocline riblets, termination distinct, strongly sigmoid; breadth 1.05 mm.

Entire shell uniform flesh-colour.

Dimensions: 13.8 x 4.7 mm, aperture 4.8 mm (holotype); 14.3 x 5.0 mm, aperture 5.3 mm (largest paratype).

Comparison: In addition to the distinguishing characters given in the key above, *Inkinga platystoma* (E.A. Smith, 1877) differs from *I. carnosa* in its narrower anal sinus, and narrower, more obliquely truncate base, and *Inkinga cockae* (Kilburn, 1977) is smoother, more subcylindrical in shape and usually narrower.

Holotype: NMSA W2716/T2022 (donated by B. Hayes). SOUTH AFRICA: Agulhas Bank, off Cape St Francis (approx. 34°13'S:24°50'E), 150 m, trawled.

Paratypes: Three specimens from type locality in B. Hayes collection.

Family Turridae H. & A. Adams, 1853

Subfamily Turrinae *s. s.*

Gemmula Weinkauff, 1875

Gemmula Weinkauff, 1875: 287. Type species (s.d. Cossmann, 1896): *Pleurotoma gemmata* Reeve, 1843 (non Conrad, 1835) [= *Gemmula hindsiana* Berry, 1958].

?*Unedogemmula* MacNeil, 1960: 101. Type species (o.d.): *Turris* [= *Pleurotoma*] *unedo* Kiener, 1840.

Remarks: The new species described here shows closest resemblance to the type species of the taxon *Unedogemmula* MacNeil, 1860, namely *Pleurotoma unedo* Kiener, 1840. Powell (1964: 269, 1966: 48) treated *Unedogemmula* as a subgenus of *Gemmula* Weinkauff, 1875, but acknowledged equal similarity to *Lophiotoma* Casey, 1904. Medinskaya (2002) described the radula and foregut anatomy of the type species of *Lophiotoma* and several species of *Gemmula*, and evidently found no major differences. In *Unedogemmula,* peripheral gemmules are typically present only on the early whorls, but in *Gemmula alwyni*, which otherwise closely resembles *G. unedo*—it was misidentified as that by Medinskaya (2002)—they continue onto the later teleoconch whorls. Obsolescence of gemmules with growth would appear to be the end of a transformation sequence, and cannot be usefully utilised to qualify taxa or subtaxa. The presence of gemmules is in itself not a valid synapomorphy, as this characterises not only *Gemmula*, but a range of turrine and crassispirine genera. Although the type species of *Unedogemmula* shows a form typical of *Lophiotoma*, namely fusiform with a long siphonal canal and strongly shouldered or angular whorls, apparent intermediate states occur within *Gemmula*. On the other hand, in *Turris invicta* Melvill, 1910, the juvenile gemmules may be so weak that the species could more appropriately be referred to *Lophiotoma* than to *Gemmula*. Radula characters (Powell 1966; Kilburn 1963;

Medinskaya 2002) in *Gemmula*, *Unedogemmula,* and *Lophiotoma* do not provide significant systematic data. Consequently, *Unedogemmula* is here tentatively synonymised with *Gemmula*.

The following couplets may be inserted into the dichotomous key to South African *Gemmula* species given by Kilburn (1983: 566):

1. Subsutural cord subequal in width to shoulder sulcus or wider than it; peripheral cord normally marked with brown or yellow 2
– Subsutural cord distinctly narrower than shoulder sulcus; peripheral cord **occasionally** patterned .... 3a (after couplet 3)

3a. Peripheral cord markedly angular, strongly spotted with brown .... **alwyni** sp. n.
– Peripheral cord neither strongly angular nor spotted with brown 4

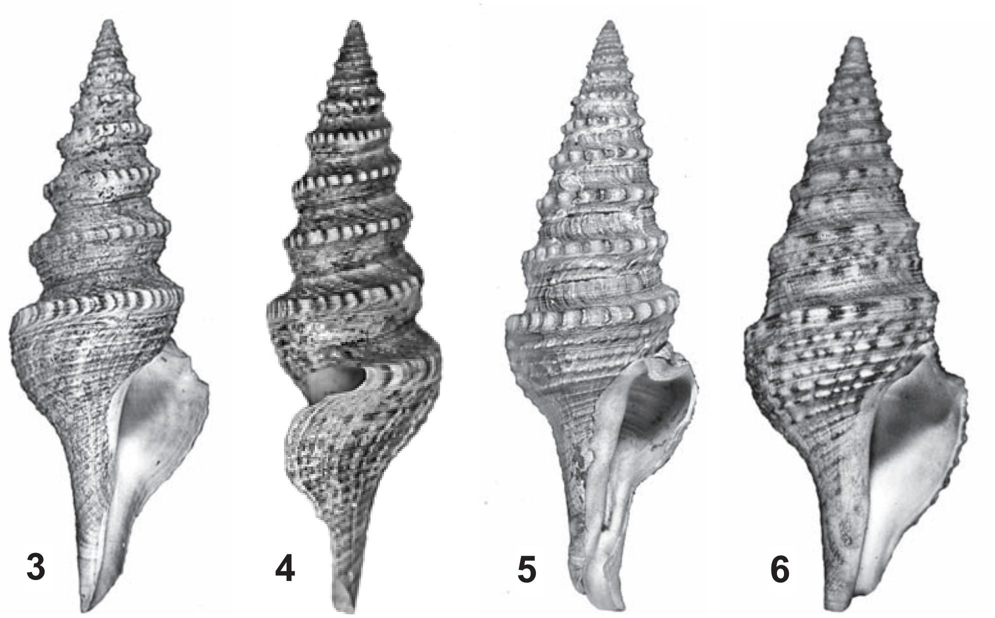
Gemmula alwyni Kilburn, sp. n.

Figs 3, 4

Gemmula kieneri (*non* Doumet, 1840): Cernohorsky, 1987: 126, figs 9, 10.
Gemmula unedo (*non* Kiener, 1840): Medinskaya, 2002: 136, 143, figs 1F, 9 (foregut anatomy), 22E (radula).

Etymology: Named in honour of Mr Alwyn Marais, writer of many popular articles on South African shells.

Description: Shell fusiform, b/l 0.32–0.36, a/l 0.42–0.53, approx. 10 teleoconch whorls, last whorl trigonal, siphonal canal moderately long, narrow and tapering, whorls with



Figs 3–6. Some *Gemmula* spp.: (3, 4) *G. alwyni* sp. n., holotype NMSA V9764/T1874; off Amanzimtoti, KwaZulu-Natal, 330–475 m., 71.0 x 23.4 mm: (3) aperture view, (4) lateral view; (5) *G. vagata* (E.A. Smith, 1895), syntype of *Pleurotoma vagata*, ZSI M 181/1, off Trincomalee, Sri Lanka, 200–350 fath. [366–640 m], 64.7 x 21.3 mm; (6) *G. unedo* (Kiener, 1840), syntype of *Pleurotoma unedo*, MNHN, 'mers de l'Inde', 62.1 x 24.3 mm.

an angular, more or less median shoulder, suture narrow, slightly notched. Outer lip strongly convex in side view, with a slight stromboid notch, anal sinus openly linguiform, directed slightly adapically.

Subsutural region not riding up previous whorl, without a differentiated cord but a single fine, angular thread with 1–3 finer threads at suture itself; sulcus not defined but area between suture and peripheral (sinus) cord broadly concave and sloping, with 3–7 widely-spaced main spiral threads and an occasional finer intermediary. Peripheral cord nearly basal on early whorls, slightly above periphery on penultimate whorl; crest of sinus cord flatly declivous, with steep sides, bearing gemmules crossing spiral ridges; ridges rounded, 2–3; gemmules prominent and tubercular on early whorls, but become low and more lunulate with age, in axial profile undulating, sometimes weak or flattened on terminal half-whorl; 19–20 gemmules on early whorls, 23–32 on penultimate whorl. Base of each whorl initially with 1 spiral ridge, increasing to 3–4 main spiral ridges, their intervals wide-set, with fine spiral threads. Ridges on base of last whorl somewhat angular, sometimes irregular in strength, wide-set with 1–3 finer intermediaries; approx. 25–30 main ridges on base of last whorl, weak to obsolete towards end of rostrum. Basal ridges rendered rugose but not nodose by coarse collabral threads.

Protoconch (Madagascar paratype) conical, apical whorl missing, remainder with coarse, orthocline axial riblets, 13 on last whorl, breadth 0.93 mm.

Pale brown to brownish-white, with axial streaks of brown, forming dots or blotches on main spiral ridges, gemmules white with orange-brown interstices.

Operculum obovate with emarginal nucleus, brownish-yellow.

Dimensions: 71.0 x 23.4 mm, aperture length 32.2 mm (holotype); largest paratype 81.8 x 29.7 mm, aperture 38.6 mm, smallest 49.1 x 15.8 mm, aperture 25.8 mm.

Comparison and remarks: Of described species, *G. alwyni* sp. n. resembles most closely *G. vagata* (E. A. Smith, 1895) from the northern Indian Ocean and the reportedly widely distributed *G. unedo* (Valenciennes in Kiener, 1840). A third member of the species complex may be mentioned, namely *G. invicta* (Melvill, 1910), described from the Arabian Gulf. Although invariably cited as a synonym of *G. unedo*, having a peripheral cord that is gemmulate only in juveniles, the holotype of *Turris invicta* (BMNH 1911.6.21.10) differs from *G. unedo s.s.* in its strongly angular subsutural cord.

Gemmula vagata: A syntype (Fig. 5) of *Pleurotoma vagata* has been examined (ZSI M 181/1), also a more recent series collected by me from west of Cape Comorin, SW India, in 300–400 m. *G. vagata* resembles *G. alwyni* in form, but bears even stronger gemmules, particularly in immature shells, the peripheral cord is narrower and much more projecting, and the subsutural ridge complex is low but more distinct.

Gemmula unedo: Dr B. Oliveira of the University of Utah regards *G. unedo auctt.* as comprising a complex of species, mainly undescribed, in the central western Pacific (pers. comm.). Based on my examination of the syntype of *Pleurotoma unedo*, preserved in the MNHN collection, I find that *G. unedo s.s.* differs from G. *alwyni* in the peripheral nodules becoming obsolete after a few teleoconch whorls; in the peripheral cord being outwardly (not adapically directed); in its nodose basal cords, and in possessing a distinct subsutural cord that rises high up the preceding whorl. This syntype (Fig. 6) is somewhat worn, with a damaged siphonal canal, but recently collected examples from Indonesia agree well.

Cernohorsky (1987), evidently misled by the row of inter-gemmular brown spots, identified Madagascar material of the present species as *Gemmula kieneri* (Doumet, 1840), and Medinskaya (2002) misidentified it as *G. unedo*. A specimen from the same ORSTOM samples, presented to NMSA by R.T. Abbott, agrees well with SE African specimens of *G. alwyni*, although smaller (largest of 95 shells seen by Cernohorsky = 60 mm; attains 65.1 mm according to Medinskaya). It is here designated as a paratype (NMSA L6785/T1614). The type material of *Pleurotoma kieneri* appears to be lost, but specimens agreeing with the type figure of this widely distributed species differ from *G. alwyni* in their narrower form, much less angular whorls, well-differentiated subsutural cord, canaliculated suture, more sharply defined gemmules and much larger protoconch.

Holotype: NMSA V9764/T1874 (donated by J. and A. Marais). SOUTH AFRICA: off Amanzimtoti (approx. 30°03'S:30°53'E), Natal South Coast, KwaZulu-Natal, 330–475 m, trawled.

Paratypes: between Amanzimtoti and Umhlanga, 330–475 m, trawled, NMSA W2799/T2025, one; off Umhlanga, Natal North Coast, KwaZulu-Natal, 330–475 m, trawled, in J. Marais collection, one; off Xai Xai – Zavora region, Mozambique, 400–480 m, trawled, J. Rosado, NMSA L6785/T1614, one; off Xai Xai, Mozambique, approx. 300–400 m, trawled, NMSA L4649/T2023; Mozambique Channel, off NW Madagascar (12°36'0"S:48°17'3"E), 300 m, NMSA J1575/T2024, ex ORSTOM, one.

Distribution: Continental slope of KwaZulu-Natal and southern Mozambique, N to NW Madagascar, in approx. 280–700 m.

Subfamily Crassispirinae Morrison, 1966

Naudedrillia Kilburn, 1988

Type species (o.d.) *Naudedrillia nealyoungi* Kilburn, 1988.

Remarks: The foregut anatomy of *Naudedrillia praetermissa* (E.A. Smith, 1904) was described by Kantor et al. (1997: 70).

The operculum of the new species here described differs from that known in other species of *Naudedrillia* in that the nucleus forms a raised, triangular 'beak' externally. The significance of this character is unknown.

Addendum to key to genus *Naudedrillia*

The following species may be added to the key given by Kilburn (1988: 278) between couplets 2 and 3:

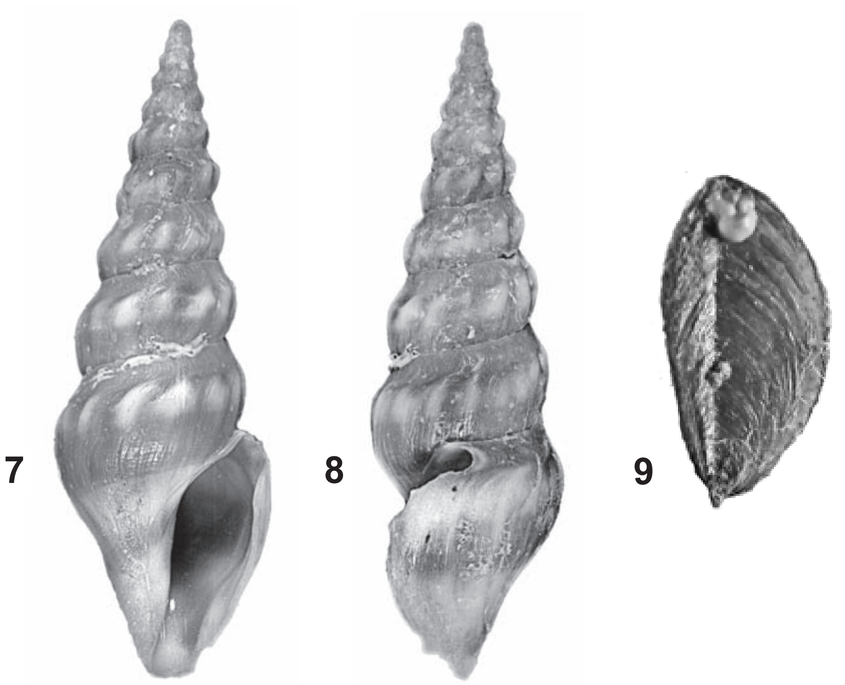
2a. Spiral sculpture present over entire surface 3
– Spiral sculpture restricted to base of last whorl .... **hayesi** sp. n.

Naudedrillia hayesi Kilburn, sp. n.

Figs 7–9

Etymology: Named in honour of Brian Hayes of Port Elizabeth, who kindly provided the type material.

Description: Shell claviform (b/l 0.33–0.37, a/l 0.31–0.37), spire more or less orthoconoid, apex somewhat papilliform, siphonal canal moderately long for genus, strongly tapering, end obliquely truncate; suture fairly shallow, not undulating; teleoconch whorls about 9; early whorls with a distinct shoulder, later ones slightly or not angular, periphery at or above midwhorl, subsutural region not swollen nor forming a cord, subsutural region weakly concave, occupying about 0.3 of whorl; left side of base of body whorl



Figs 7–9. *Naudedrillia hayesi* sp. n., holotype NMSA W2713/T2019; off Cape St Francis, Agulhas Bank, 150 m, 32.8 x 11.1 mm: (7) aperture view, (8) lateral view, (9) operculum, length 5.7 mm.

weakly concave, fasciole absent, without false umbilicus. Aperture oblong-ovate, slightly trigonal, not patulous anteriorly, siphonal canal short, very wide, oblique, termination not indented dorsally; columella callus thin, parietal pad fairly weak, barely constricting entrance to anal sinus; outer lip thin, slightly incurved, smooth, stromboid notch distinct, anal sinus deep, linguiform, directed slightly basally, occupying shoulder slope.

Sculpture of weak axial ribs (stronger on early whorls), spiral sculpture of fine threads, mainly restricted to base; growth-lines irregular but thread-like, usually faint in peripheral region, except under suture where they are very fine and regular; no terminal varix although axial ribs are well-developed behind outer lip. Axial ribs strongest at periphery, evanescing at subsutural concavity and at lower suture, on body whorl at level of parietal pad, becoming stronger and reaching base on back of body whorl, somewhat arcuate, opisthocline, in t/s low, rounded, more or less equal to intervals, but on later whorls weak to obsolete; 14–16 on penultimate whorl, eroded on early whorls. Spiral sculpture restricted to base of last whorl, from mid-columella anteriorly, consisting of thin, low spiral threads, rather irregular and rendered slightly granular by growth lines.

Colour light yellowish-brown, with a white band at periphery, weakly interrupted between ribs, protoconch white.

Protoconch pupiform, about two whorls, termination distinct, smooth; breadth 1.17 mm.

Dimensions: 32.8 x 11.1 mm (holotype); 32.9 x 10.8 mm and 25.4 x 8.9 mm (largest and smallest paratypes).

Operculum thick, unguiculate, with the nucleus prominently raised into a triangular beak, above the level of the adjacent external surface (Fig. 9).

Comparison: *N. hayesi* sp. n. is the largest known species of the genus, being slightly larger than the more subtropical *N. nealyoungi* Kilburn, 1988. It differs from that species in shape. From all described congeners, *N. hayesi* differs in one or more of the following characters: fasciole absent; base more acute; subsutural region concave; spiral sculpture restricted to base of last whorl. Protoconch resembling that of *N. nealyoungi* (see Kilburn 1988: textfig. 19). The raised 'beak' on the operculum is, as far as is known, unique in the genus.

Holotype: NMSA W2713/T2019. SOUTH AFRICA: Agulhas Bank, off Cape St Francis (approx. 34°13'S:24°50'E), 150 m, trawled.

Paratypes: Three specimens from type locality in collection B. Hayes. Additionally, two paratypes off coast of Cape Town, 150 m, trawled: one NMSA W2715/T2021, one in collection B. Hayes.

Distribution: Agulhas Bank to west of Table Bay, 150 m.

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